Volume 18: 167–170
Publication date: 31 July 2015
dx.doi.org/10.7751/telopea8890

TELOPEA
Journal of Plant Systematics

The Royal Botanic Gardens & Domain Trust

plantnet.rbgsyd.nsw.gov.au/Telopea • escholarship.usyd.edu.au/journals/index.php/TEL • ISSN 0312-9764 (Print) • ISSN 2200-4025 (Online)

A new species of *Lithothelium* (lichenized Ascomycota, Pyrenulaceae) from the Tarkine region, north-western Tasmania

Patrick M. McCarthy

Australian Biological Resources Study, GPO Box 787, Canberra, A.C.T. 2601, Australia
Patrick.McCarthy@environment.gov.au

Abstract

Lithothelium kantvilasii sp. nov. (lichenized Ascomycota, Pyrenulaceae) is described from cool-temperate rainforest in the Tarkine region of north-western Tasmania, Australia. It has a whitish and largely endophloeodal thallus, minute, solitary perithecioid ascomata with an apical ostiole and small, hyaline 3-septate ascospores. A key is provided to the seven species of *Lithothelium* that occur in Australia and Christmas Island (an Australian territory).

Introduction

Lithothelium Müll. Arg. (Pyrenulaceae) includes 30–35 mostly corticolous, temperate to tropical species with solitary or fused, black, perithecioid ascomata. Individual perithecia have an apical, excentric or lateral ostiole, an amyloid or non-amyloid hymenium, mostly unbranched paraphyses, asci with a well-defined ocular chamber and colourless to brown, 3(–9)-distoseptate or submuriform ascospores with rounded to lentiform lumina and a greatly reduced endospore (Aptroot 1991, 2006, Harris 1995). Four species are known from mainland Australia (Aptroot 2009), and two others have been described from Lord Howe Island (New South Wales) and the external territory of Christmas Island (McCarthy 1996, 2001).

In this paper, *Lithothelium kantvilasii*, a diminutive and highly distinctive species, is described as new from twigs of *Anodopetalum biglandulosum* in cool-temperate rainforest in the Tarkine region, north-western Tasmania. It is compared with several broadly similar extra-Australian taxa, and is included in an updated key to the seven Australian species of *Lithothelium*.

Methods

Observations and measurements of photobiont cells, mycobiont hyphae and ascomatal anatomy, asci and ascospores were made on hand-cut sections mounted in water and 10% KOH (K). Asci were also observed in Lugol's Iodine (I), with and without pretreatment in K. Chemical constituents were sought by means of thin-layer chromatography (Elix 2014).

Lithothelium kantvilasii P.M.McCarthy, **sp. nov.** **Fig. 1**

MycoBank No.: MB 813593

Characterized by the whitish to pale grey endophloeodal or very thinly epiphloeodal thallus lacking lichen substances; solitary perithecioid ascomata 0.17–0.28 mm wide, with an apical ostiole; a non-amyloid and non-inspersed hymenium with simple to very sparingly branched paraphyses; 8-spored asci 54–72 µm long, 12–16 µm wide; and hyaline, 3-distoseptate ascospores 12–18 µm long, 4–6 µm wide.

Type: AUSTRALIA: Tasmania: Savage River National Park: E side of Baretop Ridge, 41°18'37"S, 145°26'51"E, alt. 580 m, on twigs of *Anodopetalum biglandulosum* in cool-temperate rainforest, *G.Kantvilas 53/15*, 19 Jan 2015; holotype: HO576854.

Thallus crustose, endophloeodal to very thinly epiphloeodal, continuous to sparingly and faintly rimose, silvery white, off-white or pale greenish grey, smooth, to 2 cm wide, c. 20–30 µm thick when epiphloeodal, ecorticate, UV–. *Photobiont Trentepohlia*; cells sparse or patchily abundant, 8–16 µm long, 8–12 µm wide; interstitial hyphae 2–3 µm thick. *Prothallus* diffuse and not apparent, or a thin blackish line when contiguous with thalli of the same or different species. *Ascomata* perithecioid, numerous, semi-immersed to almost completely immersed in the substratum, mostly solitary, planoconvex to convex or occasionally subconical above, dull to slightly glossy black, circular to slightly elliptic in outline, (0.17–)0.23(–0.28) mm wide [n = 50]. *Ostiole* apical or very slightly excentric, inconspicuous or in a shallow, 20–30 µm wide concave depression that is concolorous with or paler than the ascomatal wall. *Ascomatal wall* 30–50(–60) µm thick, olivaceous black to jet-black in section, extending down to excipulum-base level, contiguous with the excipulum laterally or diverging from it; surface smooth to minutely and irregularly uneven; lower half with or without a thin covering of thallus and/or bark cells. *Excipulum* 10–15 µm thick, pale to medium olivaceous brown apically and laterally and hyaline at the base, or uniformly ± hyaline. *Hymenium* non-amyloid, Lugol's I+ orange-brown, not inspersed with granules or oil globules. *Subhymenium* c. 8–10 µm thick. *Paraphyses* 0.7–1 µm wide, long-celled, mostly simple, occasionally sparingly branched, not anastomosing. *Asci* fissitunicate, 8-spored, cylindrical, cylindroclavate or narrowly obclavate, 54–72 × 12–16 µm; apex rounded, non-amyloid; ocular chamber of immature asci tuberculate or sagittiform, usually remaining tuberculate or broadly rounded at maturity, c. 2–3 µm wide. *Ascospores* hyaline, narrowly ellipsoid to broadly fusiform or almost oblong, with 3 distosepta, lacking any trace of eusepta, usually irregularly biseriate in the ascus, occasionally uniseriate above and biseriate below (in obclavate asci), (12–)15(–18) µm long, (4–)5(–6) µm wide [n = 50]; apices rounded to acute; central lumina subglobose, broadly ellipsoid or lentiform, sometimes diamond-shaped; apical lumina usually a little longer and narrower; contents of lumina occasionally pale golden yellow; endospore 1–1.5 µm thick; perispore not apparent. *Pycnidia* not confirmed; however, black, semi-immersed structures 50–80 µm wide and resembling pycnidia are numerous; conidiogenous hyphae and conidia not seen.

Chemistry: no substances detected by TLC (J.A.Elix, pers. comm.).

The diagnostic attributes of *Lithothelium kantvilasii*, outlined above, set it well apart from most species of the genus which exhibit one or more of the following characters: clustered ascomata, fused or separate lateral ostioles and red-brown ascospores (Aptroot 1991, 2006; Harris, 1995). Among the remainder, the widespread, northern-temperate to tropical species *L. hyalosporum* (Nyl.) Aptroot has ascomata 0.3–0.5 mm wide with an excentric ostiole and ascospores 14–20(–24) µm long, 6–8(–12) µm wide, with comparatively small apical lumina. The Neotropical *L. illotum* (Nyl.) Aptroot has 0.4–1.0 mm wide ascomata with a skewed ostiole, an amyloid hymenium and ascospores 18–23 µm long, 6–10 µm wide; *L. microsporum* R.C.Harris, from Florida, has solitary, 0.4–0.5 mm wide ascomata with an excentric ostiole and, critically, exceptionally small ascospores measuring 10–12 µm long, 4–4.5 µm wide (Harris 1995); and *L. japonicum* H.Harada has an olivaceous thallus and a hymenium containing oil droplets (Harada 1997).

Etymology: The new species is named in honour of Gintaras Kantvilas, a Tasmanian lichenologist and collector of the type specimen.

Distribution and habitat: *Lithothelium kantvilasii* is known only from the type locality in the Tarkine region of north-western Tasmania, where it grows on the thin bark of centimetre-wide, understorey twigs of *Anodopetalum biglandulosum* (Cunoniaceae) beneath a rather broken *Nothofagus*-dominated canopy in cool-temperate rainforest.

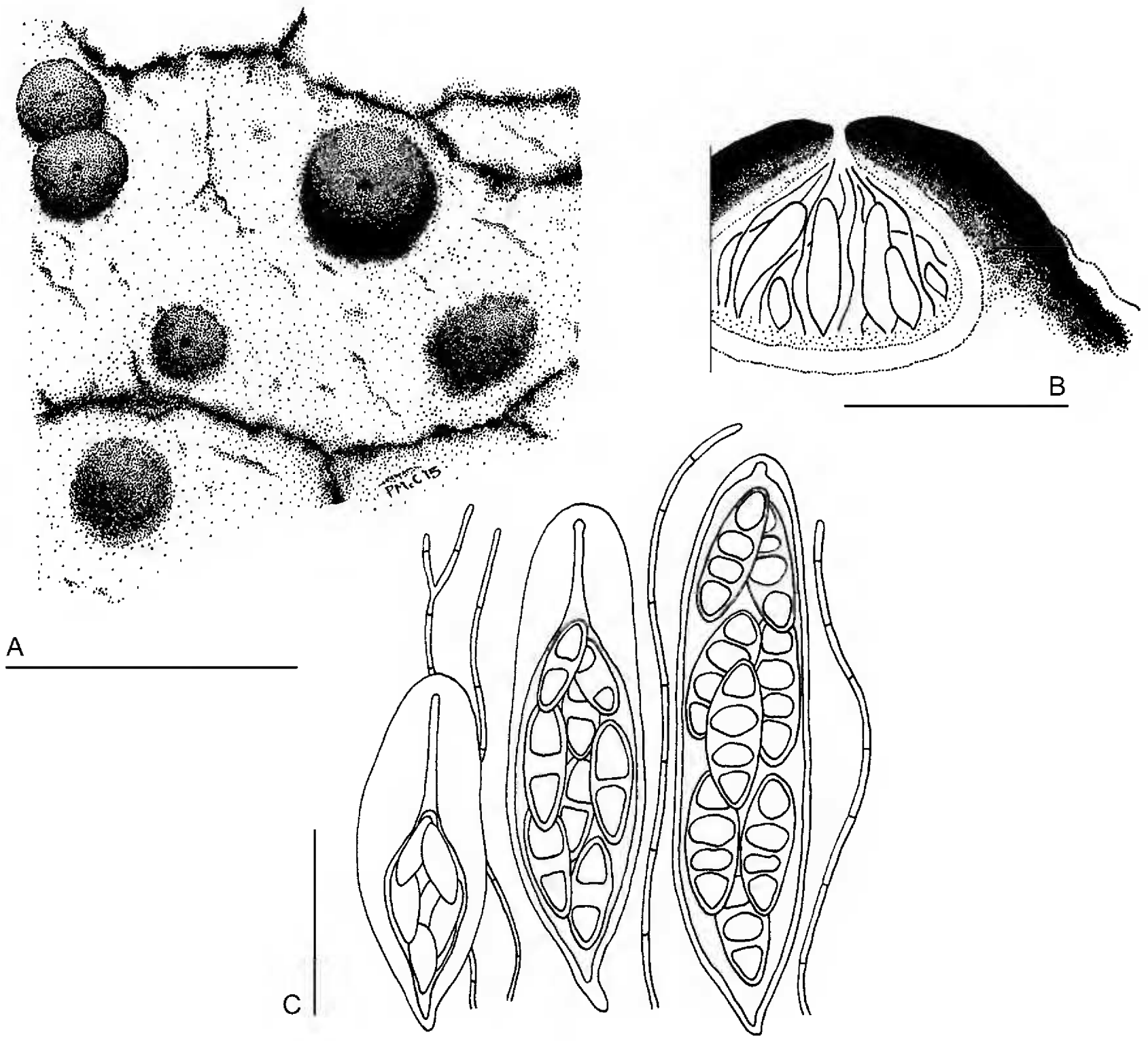

Fig 1. *Lithothelium kantvilasii* (holotype). **A**, Habit of thallus and perithecia; **B**. Part of a sectioned perithecium (semi-schematic); **C.** (left to right), Immature, submature and mature asci, with paraphyses. Scales: A = 0.5 mm; B = 0.1 mm; C = 20 µm.

Key to Lithothelium in Australia and Christmas Island (Australian Territory)

1 Thallus growing on siliceous rock; Lord Howe Island ..... ***L. austropacificum***

1: Thallus growing on the bark of trees or shrubs 2

2 Ostiole apical or slightly off-centre 3

2: Ostiole strongly excentric to lateral 4

3 Ascomata 0.17–0.28 mm diam., mostly solitary; ascospores colourless, 3-septate; Tasmania .. ***L. kantvilasii***

3: Ascomata 0.4–0.9 mm diam., mostly laterally fused in aggregations up to 4 mm long and 2 mm wide; ascospores red-brown, submuriform; NE New South Wales .....***L. hieroglyphicum***

4 Ascospores submuriform; SE Queensland ..... ***L. nanosporum***

4: Ascospores 3-septate 5

5 Ascospores red-brown; ascomata solitary; SE Queensland ..... ***L. decumbens***

5: Ascospores colourless; ascomata solitary or up to 5 sharing a common ostiole 6

6 Ascospores 10–18 µm long, 4.0–7.5 µm wide; ascomata 0.3–0.8 mm wide; Christmas Island, northern Northern Territory, E Queensland, Lord Howe Island (New South Wales) ..... ***L. obtectum***

6: Ascospores 18–31 µm long, 10–20 µm wide; ascomata 0.55–1.1 mm wide; Christmas Island ..... ***L. quiescens***

Acknowledgments

I am grateful to Gintaras Kantvilas for making the specimen available for study, and to Jack Elix for chemical analysis. The new lichen was collected during a Bush Blitz survey co-funded by the Australian Government and BHP Billiton.

References

Aptroot A (1991) A monograph of the Pyrenulaceae (excluding *Anthracothecium* and *Pyrenula*) and the Requienellaceae, with notes on the Pleomassariaceae, the Trypetheliaceae and *Mycomicrothelia* (lichenized and non-lichenized Ascomytes). *Bibliotheca Lichenologica* 44: 1–178 http://dx.doi.org/10.1017/S0024282906005913

Aptroot A (2006) Three new species of *Lithothelium* (Pyrenulaceae) from China and Thailand, with a revised world key and annotated list of species. *Lichenologist* 38: 541–548

Aptroot A (2009) Pyrenulaceae. *Flora of Australia* 57: 449–480

Elix JA (2014) *A Catalogue of Standardized Thin-Layer Chromatographic Data and Biosynthetic Relationships for Lichen Substances*, 3rd edn. (Published by the author, Canberra)

Harada H (1997) *Lithothelium japonicum* (lichenized Ascomycotina, Pyrenulaceae), a new pyrenocarpous lichen from central Japan. *Bryologist* 100: 204–206 http://dx.doi.org/10.1639/0007-2745(1997)100[204:LJLAPA]2.0.CO;2

Harris RC (1995) *More Florida Lichens including the 10¢ Tour of the Pyrenolichens*. (Privately published, New York)

McCarthy PM (1996) *Lithothelium austropacificum* sp. nov. (Pyrenulaceae) from Lord Howe Island, Australia. *Lichenologist* 28: 290–294 http://dx.doi.org/10.1017/S0024282996000369

McCarthy PM (2001) The genus *Lithothelium* (Pyrenulaceae) in Christmas Island, Indian Ocean. *Australas. Lichenol.* 49: 7–9

Manuscript received 29 June 2015, accepted 23 July 2015